S3A7 Board

User Guide

R01AN3068EU0101
Rev.1.01
Jul 13, 2017

Introduction

This document represents universal usage of the S3A7 board mounted on a base board to make an Application Module. The document describes the hardware platform connection interface, the S3 Series microcontroller (MCU), along with the RL78/G1D-SK PMOD™ module Bluetooth® interface, schematics, and Bluetooth connectivity.

Target Device

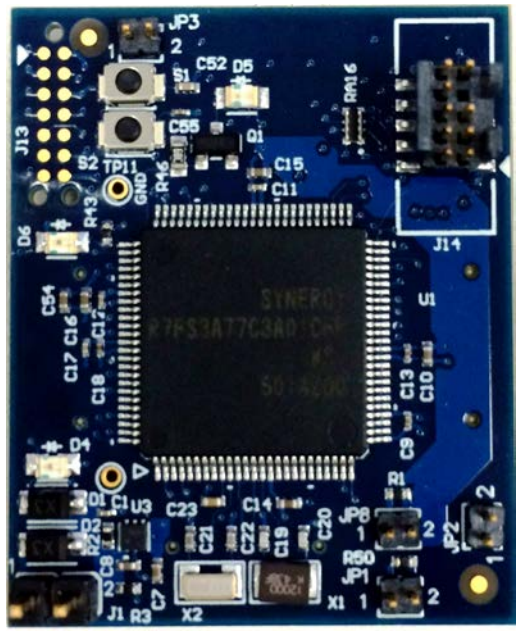
This Solution Kit's Synergy Microcontrollers S3 Series board includes the S3A7 MCU, ARM® Cortex®-M4 CPU core with FPU (see [1]). This module has program/debug interface through a micro-A USB interface.

Contents

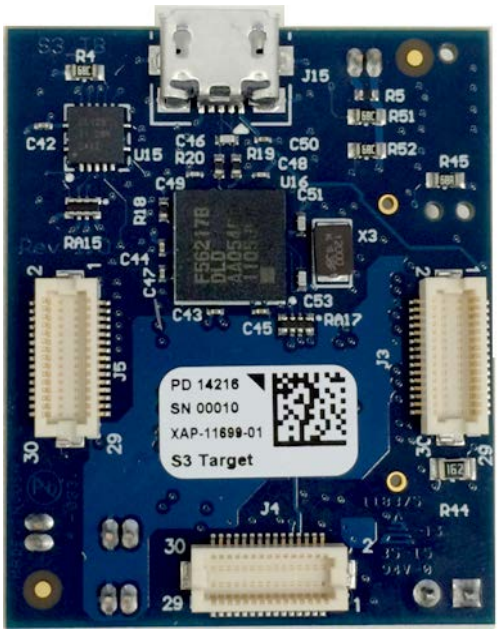
1. Overview

The S3 Series board has an S3A7 48-MHz ARM® Cortex®-M4 microcontroller with 1 MB of code flash and 192 KB of SRAM. There are two pushbutton switches, three on-board LEDs, and a micro-A USB connector for JTAG programming and debugging. The board has three 30-pin, board-to-board connectors to plug in to any application base board to make a module, such as the Bluetooth Solution Kit-Activity Module (see [2]).

Figure 1 shows top and bottom views of the S3 Series board.



TOP View



BOTTOM View

Figure 1 Synergy S3 Series Module

2. Board Specifications

Table 1 lists the specifications for the S3 Series board.

Table 1 S3 Series Specifications

Item	Content
Dimension	1.5 inch x 1.25 inch
Operation Power Supply Voltage	5.0 V
Maximum Power Supply Current	100 mA
Operating Ambient Temperature/Humidity	0°C to +60°C, 10% to 80% RH (non condensing)
Storage Temperature	–15°C to +60°C, 10% to 80% RH (non condensing)

For detail specifications on the S3 Series MCU, see [1].

3. S3 Series Board System

For its interface connections, the S3 Series board has three board-to-board 0.5 mm pitch, SMT female 30-pin header connectors located at the bottom of the board. The board has Green, Yellow and Red LED indicators. The green LED indicates power on and the red LED indicates an active JTAG program/debug action. For the user interface, use the S2 pushbutton as your input. The yellow LED is the output indicator. Pressing the S1 pushbutton resets the S3A7 MCU.

In addition, this S3 Series board uses JTAG for programming/debugging interface. The JTAG signals can be used through the SEGGER J-Link® OB USB port (J15), directly through the JTAG connector (J14), or through the J-Link OB connector (J13). The SEGGER J-Link OB connector and the J-Link OB USB port are connected to the RX621 microcontroller (U16). For detail schematics, see Circuit Diagrams (sheet 4 of 4).

Table 2 JTAG pins

JTAG Description	S3 Series S3A7	
	Function Name	Pin
Test Mode Select	TMS/SWDIO	P108 (P1_8)
Test Clock	TCK/SWCLK	P300 (P3_0)
Test Data Out	TDO	P109 (P1_9)
Test Data In	TDI	P110 (P1_10)
Reset	RESET#	RESET#

Enable JTAG debugging on the S3A7 board using jumper J2.

- Insert jumper J2 insert (ON position).
- JTAG can be disabled by removing jumper J2 insert (OFF position).

4. Example of Operating the S3 Series Board with an Activity Module

The S3 Series board can be used as microcontroller add-on board to base boards with a variety of sensors. The combined S3 Series board plus Application base board form an Application Module that becomes a development platform for product solutions. For example, the S3A7 board can be used for Bluetooth communication when used with the RL78/G1D PMOD Module. For debugging and programming, you can use micro-A USB connector, J15. For details on using the S3A7 programmer/debugger tool and information on project development, see the Renesas website.

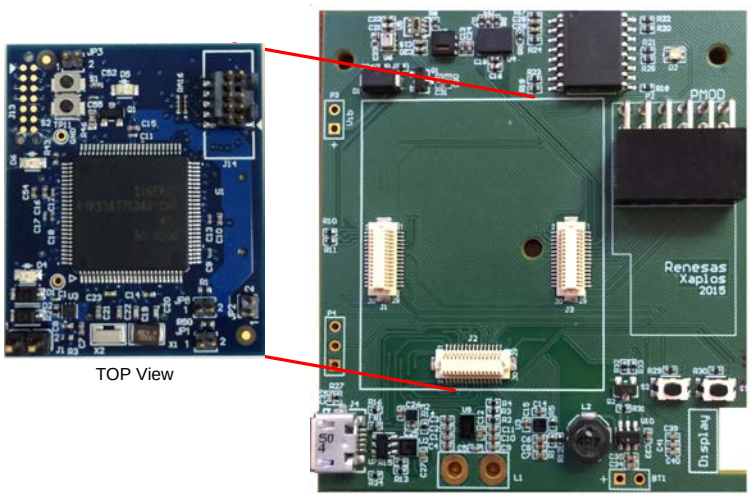


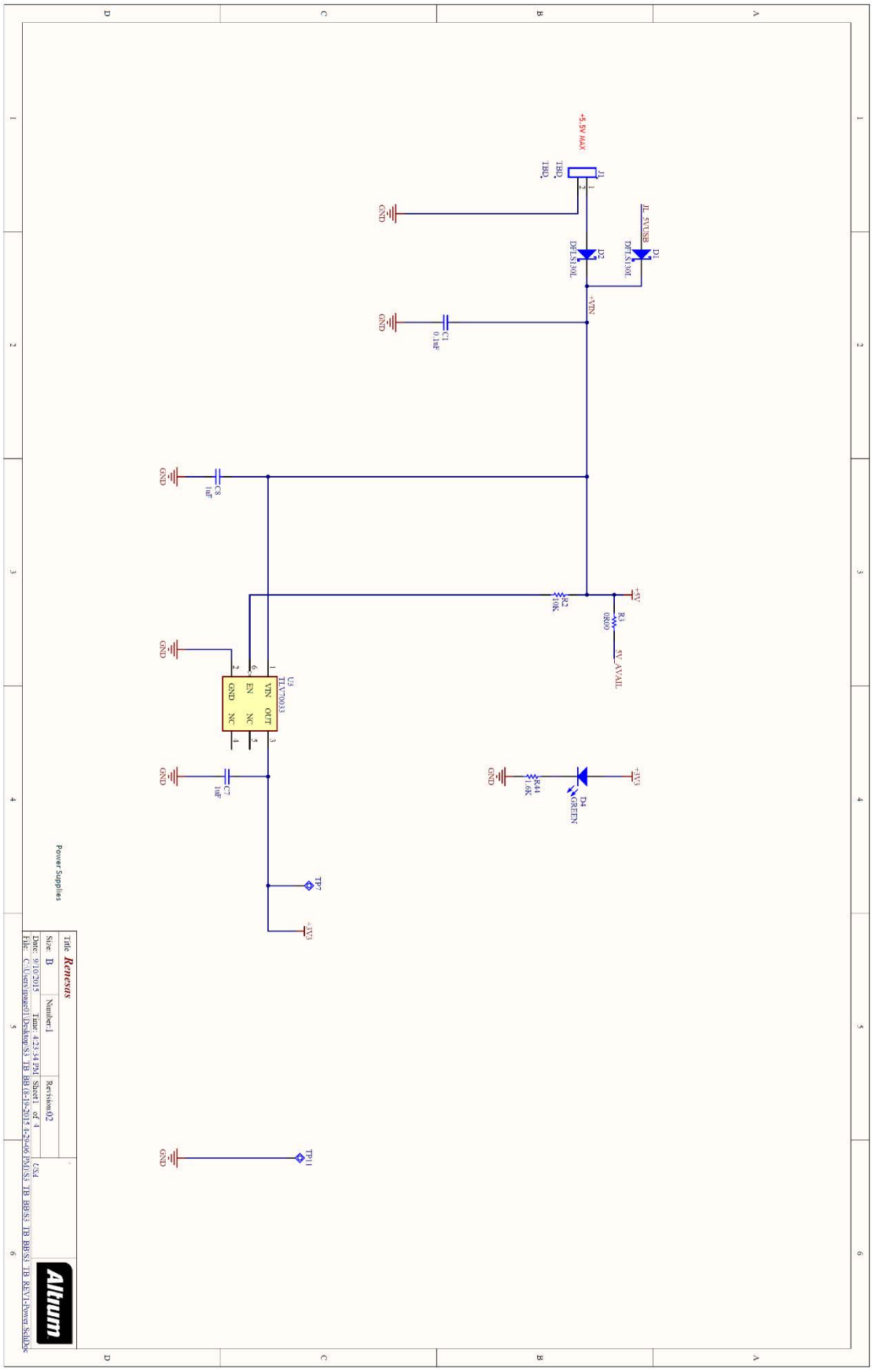
Figure 2 Example of S3 Series Board interface pin configuration with an Activity Module

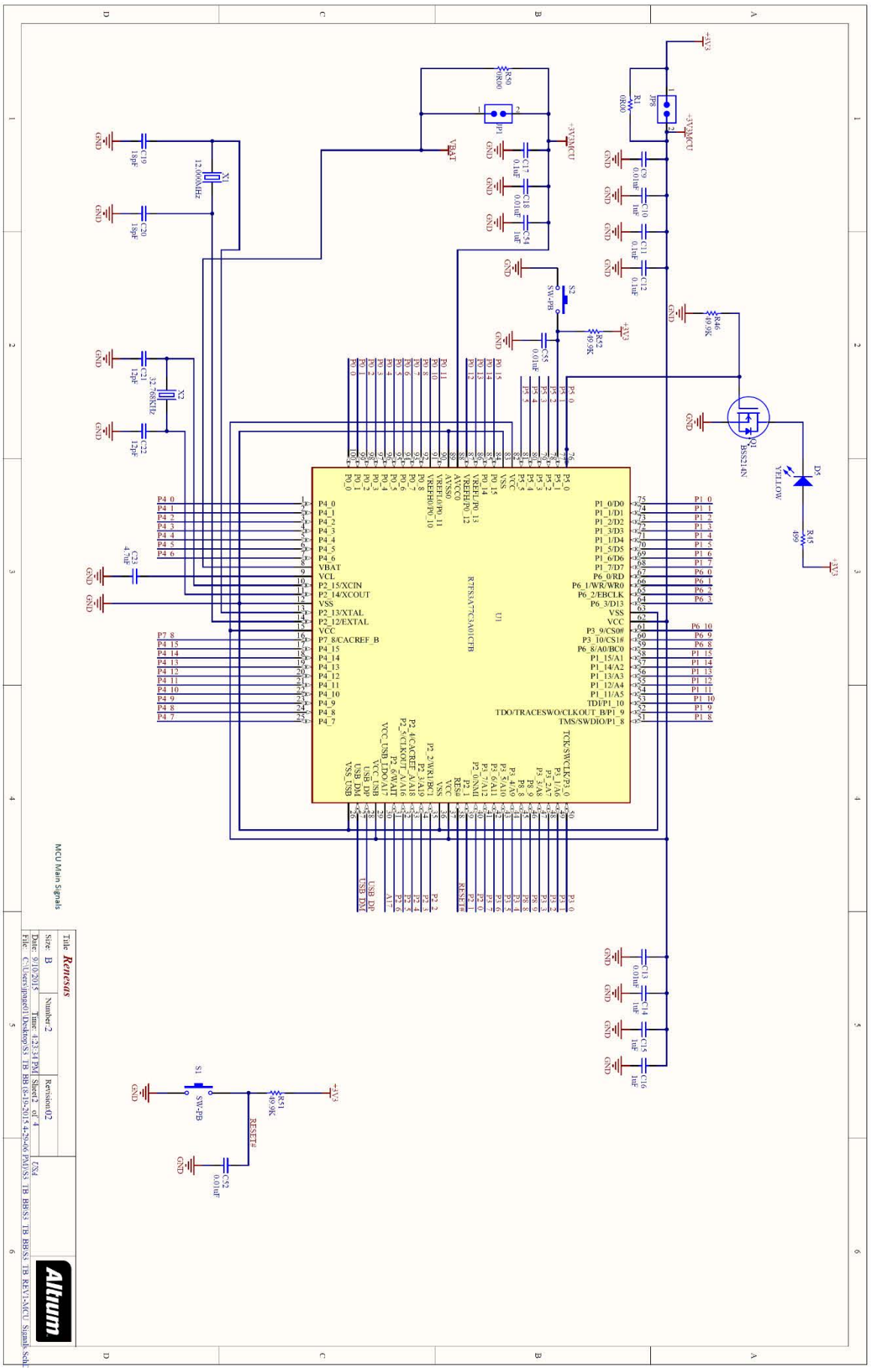
5. References

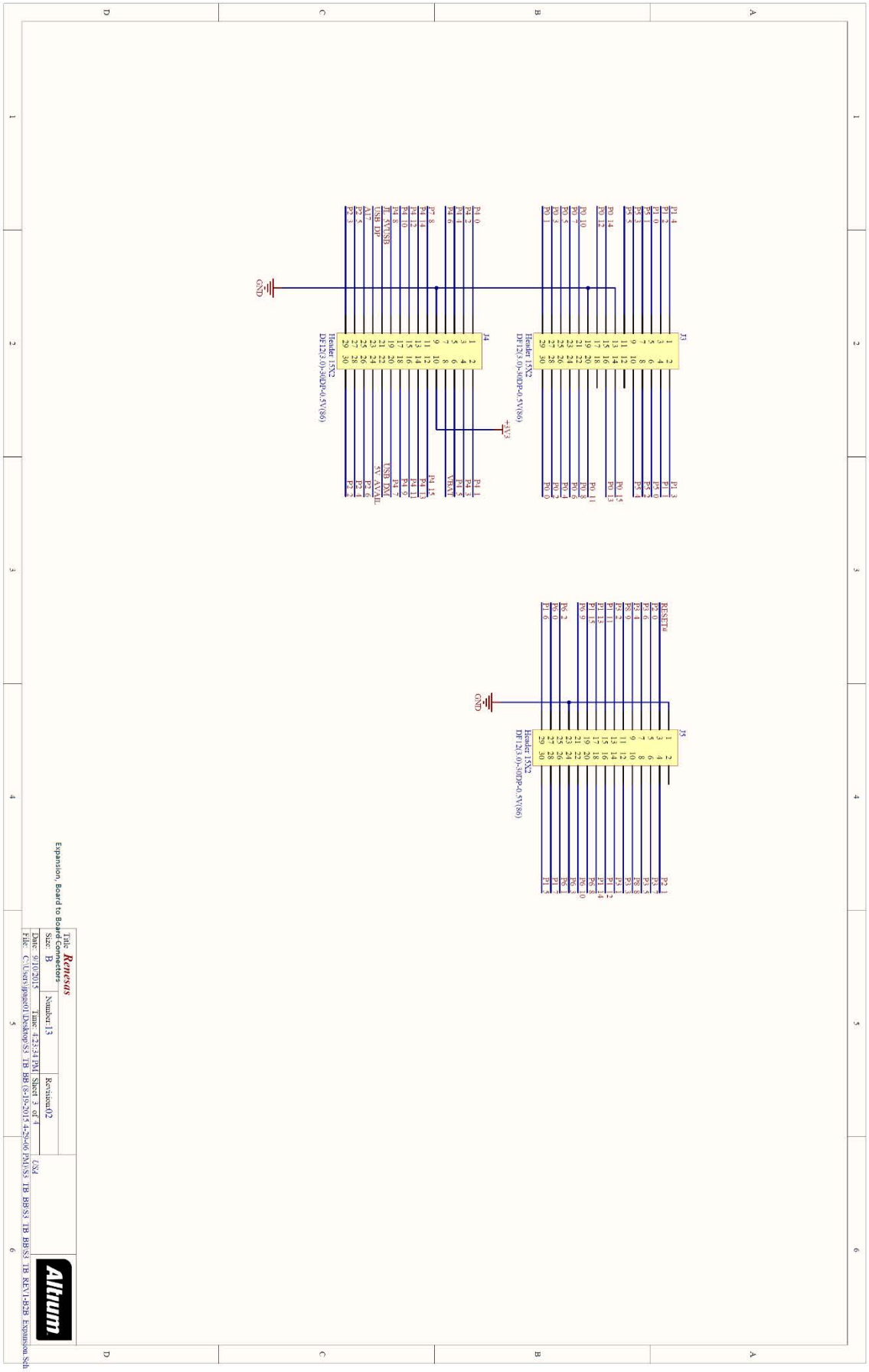
[1] S3A7 User's Manual: Microcontrollers (R01UM0002EU0120, Rev.1.20, Aug 26, 2016)

[2] RL78/G1D Solution Kit-Activity Module Hardware Manual (R01AN2960EU0100_RL78G1D, Rev.1.00, Jul 31, 2016)

6. Circuit Diagrams




RTE5A7C3A01CFB
MCU Main Signals
Renesas
Altium


J3
Header 15X2
DF12(3.0)-60DP-0.5V(86)
J4
Header 15X2
DF12(3.0)-60DP-0.5V(86)
J5
Header 15X2
DF12(3.0)-60DP-0.5V(86)
GND
+3V3
RESET#
USB DP
USB DM
Expansion, Board to Board Connectors
Renesas
Altium
Number 13
Revision 02
Sheet 2 of 4
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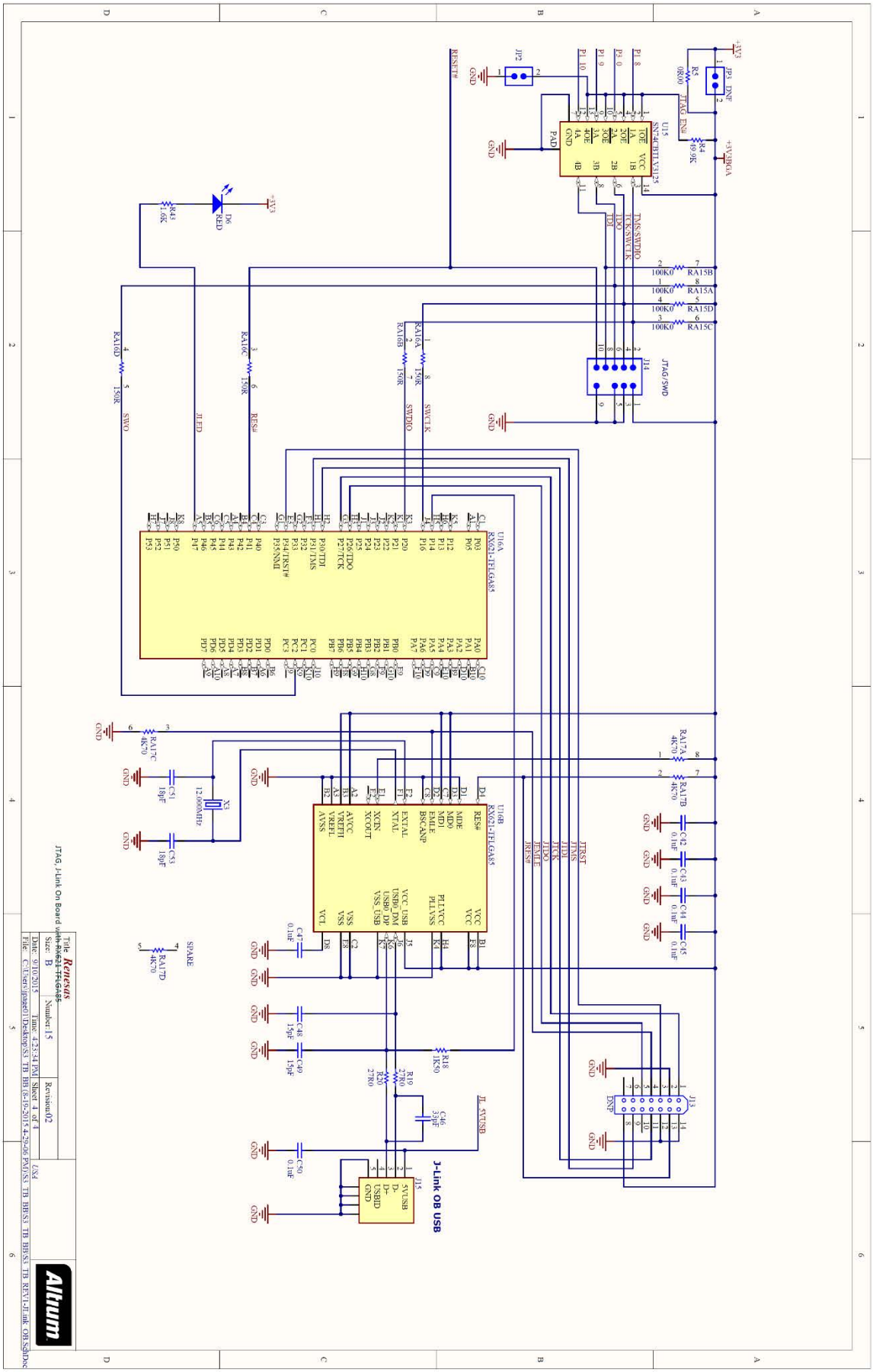

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Revision History

		Description	
Rev.	**Date**	**Page**	**Summary**
1.01	Jul 13, 2017	–	Initial Release

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Handling of Unused Pins

   Handle unused pins in accordance with the directions given under Handling of Unused Pins in the manual.

   — The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible. Unused pins should be handled as described under Handling of Unused Pins in the manual.

2. Processing at Power-on

   The state of the product is undefined at the moment when power is supplied.

   — The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the moment when power is supplied.
   In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the moment when power is supplied until the reset process is completed.
   In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the moment when power is supplied until the power reaches the level at which resetting has been specified.

3. Prohibition of Access to Reserved Addresses

   Access to reserved addresses is prohibited.

   — The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.

4. Clock Signals

   After applying a reset, only release the reset line after the operating clock signal has become stable. When switching the clock signal during program execution, wait until the target clock signal has stabilized.

   — When the clock signal is generated with an external resonator (or from an external oscillator) during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Moreover, when switching to a clock signal produced with an external resonator (or by an external oscillator) while program execution is in progress, wait until the target clock signal is stable.

5. Differences between Products

   Before changing from one product to another, i.e. to a product with a different part number, confirm that the change will not lead to problems.

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